

Appl. No. 10/628,894
Examiner: PHAM, THANH V, Art Unit 2823
In response to the Office Action dated August 12, 2004

Date: November 4, 2004
Attorney Docket No. 10112581

crystalline quartz and diffusion in an oxidizing ambient can result in oxidation enhanced diffusion or oxidation retarded diffusion. Please see pages 200 and 264 of Wolf et al. In sum, Wolf et al. simply teach that silicon oxide may have a more open structure than the crystalline silicon oxide (quartz) due to the lower density and may be removed by HF acid.

MPEP 2142 reads in part:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The references cannot be combined in the manner relied upon by the office action because the prior art does not teach the desirability of the combination.

In connection with the first criteria of the *prima facie* case of obviousness, MPEP 2143.01 states that the prior art must teach the desirability of the claimed invention. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)

Applicant submits that the office action fails to show suggestion or motivation to combine the reference teachings insofar as the desirability of the combination is not taught in the prior art. Namely, the office action simply states "it would have been obvious to one of ordinary skill in the art to at the time the invention was made to employ an oxidizing and etching steps of Wolf et al in combination of the first and fifth method of Forster et al as the oxidizing steps would be selected in accordance with the trench capacitor formation in order to enlarge the electrode surface taught by Forster et al."

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Where in the prior art does it suggest that the desirability of partially oxidizing an exposed doping region to form a doped oxide region thereon, and removing the doped oxide region to form a bottle-shaped trench? What problem would be solved by such a combination? Forster et al merely disclose a lower trench region may be widened by etching, while Wolf et al disclose a silicon oxide may be removed by HF acid. Since Forster et al do not teach a doping region that is partially oxidized, there is no motivation to apply Wolf et al to remove the oxide region by wet etching

Furthermore, in *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780 (Fed. Cir. 1992), the Federal Circuit stated:

It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior so that the claimed invention is rendered obvious. *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." (quoting *In re Fine*, 837 F.2d at 1075, 5 USPQ2d at 1600).

It is the Applicant's belief that the present rejection fits the Federal Circuit's description of an impermissible rejection under §103(a). The office action simply states certain elements of the present invention and then locates isolated disclosures of those components. The only motivation to combine the references in the manner described in the office action comes from the Applicant's own disclosure.

For at least these reasons, Applicant submits that the rejection of claims 1-20 should be withdrawn and the application passed to issue.

Even when taken in combination, Forster et al and Wolf et al, fail to teach or suggest a method for forming a bottle-shaped trench comprising the steps of, *inter alia*, partially oxidizing an exposed doping region to form a doped oxide region thereon, and removing the doped oxide region to form a bottle-shaped trench, as recited in claims 1 and 9.

In connection with the third criteria, MPEP 2143.03 goes on the state:

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To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

As noted previously, Forster et al disclose a method for fabricating a trench capacitor, in which a lower trench region is enlarged for the purpose of enlarging the surface of the electrodes by means of an etching operation. Namely, in Forester et al, the lower trench region is widened by means of a further etching step. However, Forster et al do not teach partially oxidizing an exposed doping region to form a doped oxide region thereon, and removing the doped oxide region to form a bottle-shaped trench, as recited in claims 1 and 9.

Furthermore, Wolf et al disclose wet etching silicon dioxide with hydrofluoric (HF) acid. Namely, Wolf et al teach that silicon oxide may have a more open structure than the crystalline silicon oxide (quartz) due to the lower density and may be removed by HF acid. However, Wolf et al do not teach partially oxidizing an exposed doping region to form a doped oxide region thereon, and removing the doped oxide region to form a bottle-shaped trench, as recited in claims 1 and 9.

As neither Forster et al nor Wolf et al, whether taken alone or in combination, teach or suggest partially oxidizing an exposed doping region to form a doped oxide region thereon, and removing the doped oxide region to form a bottle-shaped trench, as recited in claims 1 and 9, it is Applicant's belief that claims 1 and 9 are allowable over the cited references. Insofar as claims 2-8 and 10-20 depend from claims 1 and 9, respectively, it is Applicant's belief that these claims are also in condition for allowance.

Conclusion

For the reasons described above, the Applicant believes that the application is now in condition for allowance and respectfully requests so.

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Respectfully submitted



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